



## Subject card

Subject name and code	Geodesy and satellite navigation in transport , PG_00044578						
Field of study	Transport						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Grzegorz Nykiel					
	Teachers	dr inż. Tadeusz Widerski dr inż. Grzegorz Nykiel					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	E-learning hours included: 0.0 Adresy na platformie eNauczanie:						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	45	5.0		25.0		75
Subject objectives	Introduction to surveying and satellite navigation techniques used in transport.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U09] able to, when formulating and solving engineering problems in transport, use the right methods and devices to carry out measurements of basic values and parameters used in transport, carry out stress tests of structures, select the right materials, select elements of devices	The student uses reference systems and coordinate systems used in geodesy and satellite navigation. Student is able to choose appropriate measurement method.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information		
	[K6_U06] able to plan and conduct simple laboratory and operational experiments and simulations in the area of transport; able to interpret the results and formulate conclusions	The student is able to plan and carry out measurement experiments. They can interpret the obtained results in terms of reliability and accuracy.			[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[K6_W04] has basic knowledge of informatics, electronics, telecommunications, automation and control, information technologies, computer graphics, geodesy and satellite navigation which is useful for understanding how it can be applied in transport	The student is able to indicate the areas of application of geodetic systems and satellite navigation in transport and define the technical and IT conditions of such applications.			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		

Subject contents	<p><b>LECTURES:</b>  Basic concepts of geodesy and navigation. Earth as a reference surface for measurements. Reference and coordinate systems used in navigation and geodesy. Surveying instruments - purpose, functions and construction. Methods of geodetic measurements. Introduction to GNSS satellite navigation systems. Techniques and methods used in GNSS measurements. Earth's gravitational fields and gravimetric measurements. Use of geodetic techniques in transportation.</p> <p><b>LABORATORIES:</b>  Measurements using basic surveying instruments, i.e. theodolites, total stations, levelers, and GNSS receivers.</p>											
Prerequisites and co-requisites	Basic knowledge of physics and mathematics.											
Assessment methods and criteria	<table border="1" data-bbox="450 548 1489 651"> <thead> <tr> <th data-bbox="450 548 794 584">Subject passing criteria</th> <th data-bbox="794 548 1139 584">Passing threshold</th> <th data-bbox="1139 548 1489 584">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="450 584 794 620">Exam</td> <td data-bbox="794 584 1139 620">60.0%</td> <td data-bbox="1139 584 1489 620">60.0%</td> </tr> <tr> <td data-bbox="450 620 794 651">Laboratory reports</td> <td data-bbox="794 620 1139 651">60.0%</td> <td data-bbox="1139 620 1489 651">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Exam	60.0%	60.0%	Laboratory reports	60.0%	40.0%
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Exam	60.0%	60.0%										
Laboratory reports	60.0%	40.0%										
Recommended reading	Basic literature	1. Teunissen P, Montenbruck O. Springer Handbook of Global Navigation Satellite Systems, Springer 2017 2. W. Schofield, Mark Breach, Engineering Surveying, Butterworth-Heinemann; 6th edition (April 27, 2007)										
	Supplementary literature	Zhiping Lu, Yuning Qu, Shubo Qiao, Geodesy, Introduction to Geodetic Datum and Geodetic Systems, Springer 2014										
	eResources addresses											
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											